CLAIMS

1.   A method of generating spreading codes generating a bth chip C(a,b) of an ath spreading code by a following equation, assuming that e is a base of natural logarithm

5   and that N is a length of the spreading code:

$$C(a,b) = e^{j(2n\pi/N)} \ldots\ldots (1)$$

where n=a×b, a=0~N-1, and b=0~N-1.

2.   The method of generating spreading codes according

10   to claim 1, wherein spreading codes with different spreading code length are generated by successively multiplying N in Eq.(1) by k (k is positive integers).

3.   A CDMA transmission apparatus comprising:

15   a spreading code generator that generates a bth chip C(a,b) of an ath spreading code by a following equation, assuming that e is a base of natural logarithm and that N is a length of the spreading code:

$$C(a,b) = e^{j(2n\pi/N)} \ldots\ldots (1)$$

20   where n=a×b, a=0~N-1, and b=0~N-1; and

        a spreader that spreads a transmission signal using the spreading code generated in the spreading code generator.

25   4.   The CDMA transmission apparatus according to claim 3, wherein the spreading code generator rearranges an order of chips of the spreading code generated in Eq.(1)

for each spreading code.

5.   The CDMA transmission apparatus according to claim 3, further comprising a scrambler that multiplies the transmission signal, the spreading code or a spread signal by a scrambling code.

6.   The CDMA transmission apparatus according to claim 3, wherein the spreading code generator generates spreading codes with different spreading code length by successively multiplying N in Eq.(1) by k (k is positive integers).

7.   The CDMA transmission apparatus according to claim 3, wherein an inverse discrete Fourier transformer is applied to the spreading code generator and the spreader.

8.   The CDMA transmission apparatus according to claim 3, wherein a plurality of cascaded inverse discrete Fourier transformers is applied to the spreading code generator and the spreader, and performs inverse discrete Fourier transform on the transmission signal hierarchically.

9.   A CDMA reception apparatus comprising: a spreading code generator that generates a bth chip $C(a,b)$ of an ath spreading code by a following equation, assuming that

e is a base of natural logarithm and that N is a length of the spreading code:

$$C*(a,b)=e^{-j(2n\pi/N)} \quad \text{......} (3)$$

where $n=a \times b$, $a=0 \sim N-1$, and $b=0 \sim N-1$; and

5   a despreader that despreads a received signal using the spreading code generated in the spreading code generator.

10.   The CDMA reception apparatus according to claim 9,

10   wherein a discrete Fourier transformer is applied to constitute the spreading code generator and the despreader.

11.   The CDMA reception apparatus according to claim 9,

15   wherein a plurality of cascaded discrete Fourier transformers is applied to the spreading code generator and the despreader, and performs discrete Fourier transform on the received signal hierarchically.